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Inventor: Chuan-Yu Hsu, Jay Liu, T. J. Hsu
For: **METHOD AND USER INTERFACE FOR PERFORMING AN AUTOMATIC SCAN OPERATION FOR A SCANNER COUPLED TO A COMPUTER SYSTEM**

Enclosed are:

(×) Specification __13__ pages.

(×) __2__ Sheets of drawings

(×) Recordation Form Cover sheet with __2__ pages assignment.

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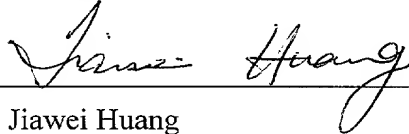
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METHOD AND USER INTERFACE FOR PERFORMING AN AUTOMATIC SCAN

OPERATION FOR A SCANNER COUPLED TO A COMPUTER SYSTEM

5

BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention relates to scanner technology, and more particularly, to a method and user interface for performing an automatic scan operation for a scanner coupled to a

10   computer system, which allows the user to acquire scanned images in a more user-friendlier manner.

2. Description of Related Art:

A scanner allows a user to convert the printed matter on a document into a digital image for further processing by a computer. In the use of a scanner, however, it requires

15   highly-experienced users to do the image processing tasks properly. For inexperienced users, it usually requires a long period to learn, typically in a trial-and-error manner, which would make the training quite cost-ineffective since additional electricity and paper cost may be required.

The U.S. Patent No. 4,837,635 discloses a method that allows the user to first ob-

20   tain a primitive scanned image from the scanner, and then specify suited image processing settings such as size and scan area for the scanner to perform a second scan operation on the original document to thereby obtain a final scanned image. By this method, the final scanned image is closed in image qualities to the original document. One drawback to this patent, however, is that it is quite laborious to use due to the reason that it requires the user

to specify the settings. Moreover, it is still insufficient in functionality to meet user demands in high-end image processing.

In the use of many conventional image scan programs, it requires the user to specify various image processing settings to the scan operation. To specify these settings

5   properly, however, the user is required to have learned knowledge background in the science of image processing. Therefore, for unlearned and inexperienced users, it would be highly difficult for them to specify these settings properly, which would make the use of the scanner very user-unfriendly.

In summary, conventional user interfaces for scanner operation have the following

10   drawbacks.

First, they require the user to have learned knowledge background in the science of image processing in order to properly specify the image processing settings, which makes the use of the scanner quite difficult and user-unfriendly.

Second. if a user has no such knowledge background, the user needs to spend

15   much time to learn the image scan operation, typically in a trial-and-error manner, which would make the use of the scanner quite cost-ineffective.

Third, the U.S. Patent No. 4,837,635 provides only limited functionality to the image processing, which would not meet user demands in high-end image processing.

20   SUMMARY OF THE INVENTION

It is therefore an objective of this invention to provide a method and user interface for use on a computer system coupled with a scanner for performing an automatic scan operation, which allows the user to operate the scanner without requiring the user to specify image processing settings, so that the user operation can be made very easy.

In accordance with the foregoing and other objectives, the invention proposes a new user interface for scanner. Fundamentally, the invention allows the user to scan an original document without requiring the user to specify image processing settings to the scan operation. The suited image processing settings can be automatically specified based

5   on the image qualities of the primitive scanned image, and which are specified to such values that would make the image qualities of the final scanned image as close to the image qualities of the original document as possible. This feature allows users of any skill levels to perform the scan operation without having to specify any image processing settings to the scan operation, making the use of the scanner easier and more user-friendly

10   than the prior art.

The invention is designed for use with a user interface incorporated in a computer system coupled with a scanner for performing an automatic scan operation on an original document. The computer system runs a scanner driver and an application program. The scanner driver is used to drive the scanner, and the application program can process the

15   scanned image as an image file.

The method of the invention includes the following procedural steps: (1) storing a set of default image processing settings in the user interface; (2) activating the scanner to perform a primitive scan operation on the original document based on the default image processing settings to thereby obtain a primitive scanned image which is then transferred

20   to the scanner driver; (3) activating the scanner driver to perform a set of image processing routines on the primitive scanned image to thereby obtain the image qualities of the original document; and based on the image qualities of the original document, specifying a set of suited image processing settings for optimal scan of the original document; and (4) activating the scanner to perform a final scan operation on the original document

based on the suited image processing settings to thereby obtain a final scanned image which is transferred to the application program for use by the application program. The application program can be either an image editing program or a word processor that can accept the final scanned image as an image file.

5   In the foregoing method, the image processing routines include automatic cutting, distortion correction, color calibration, and automatic character recognition. Further, the scanner driver will specify the suited image processing settings to such values that will make the image qualities of the final scanned image as close to the image qualities of the original document as possible. These suited image processing settings are then used in the

10   final scan operation to obtain the final scanned image whose image qualities would be close to the original document. The final scanned image is then transferred to the scanner driver in the computer system, and then transferred via the scanner driver to the application program specified by the user through the user interface. The application program can be either an image editing program or a word processor that can accept the final scanned

15   image as an image file.

By the invention, the user first needs to place the original document on the scanner, and then press a scan button to activate the scan operation. After this, all the user needs to do is simply wait until the final scanned image is produced. The user needs not to specify any image processing settings. These will be automatically specified by the user

20   interface based on the image qualities of the primitive scanned image. This feature allows users of any skill levels to perform the scan operation without having to specify any image processing settings to the scan operation, making the use of the scanner easier and more user-friendly than the prior art. Moreover, since the user needs not to spend time and

material on learning the operation of the scanner, it also makes the use of the scanner more economical.

BRIEF DESCRIPTION OF DRAWINGS

5   The invention can be more fully understood by reading the following detailed description of the preferred embodiments, with reference made to the accompanying drawings, wherein:

FIG. 1 is a schematic block diagram of the incorporation of the user interface of the invention in a computer system coupled with a scanner; and

10   FIG. 2 is a flow diagram showing the procedural steps involved in the method of the invention for performing an automatic scan operation on an original document.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 is a schematic block diagram of the incorporation of the user interface of the invention, as the block designated by the reference numeral 50, in a computer system

15   20 coupled with a scanner 10. The computer system 20 runs a scanner driver 30, which is a software program, for driving the scanner 10. Further, the computer system 20 runs an application program 40 which can process the scanned image from the scanner 10 as an image file. The user interface 50 contains a set of default image processing settings, in-

20   cluding, for example, color setting, DPI setting, and image size setting. The block designated by the reference numeral 60 is used to represent the input from user operation.

When the user wants to obtain a scanned image from an original document (not shown), the user first needs to place the original document (not shown) on the scanner 10. Next, the user simply needs to press a scan button (not shown) to cause the user interface

50 to activate the scanner 10 to perform a primitive scan operation on the original document (not shown) based on the default image processing settings in the user interface 50 to thereby obtain a primitive scanned image. The primitive scanned image is then transferred to the scanner driver 30 in the computer system 20.

5   Next, the scanner driver 30 performs an image-enhancement process on the primitive scanned image. The image-enhancement process includes several image processing routines, including automatic cutting, distortion correction, color calibration, and automatic character recognition.

Based the results from the foregoing image processing routines, the scanner driver 10   30 can recognize the image qualities of the original document and thereby automatically specify a set of suited image processing settings for optimal scan of the original document. These suited image processing settings also include color rendition, DPI, and image size, which will then override the default settings in the user interface 50, and also include the optimal settings for automatic cutting, distortion correction, color calibration, and 15   automatic character recognition.

The scanner driver 30 will then use these suited image processing settings to perform a final scan operation on the same original document to thereby obtain a final scanned image. The final scanned image is then transferred to the scanner driver 30 in the computer system 20, and then transferred via the scanner driver 30 to the application 20   program 40 specified by the user through the user interface 50. The application program 40 can be either an image editing program or a word processor that can process the final scanned image as an image file.

FIG. 2 is a flow diagram showing the procedural steps involved in the method of the invention for performing an automatic scan operation on the original document. This

method is used with the computer system 20 and the scanner 10 shown in FIG. 1 and is performed by the user interface 50.

In the first step S100, the user interface 50 is activated. This user interface 50 is preset with a set of default image processing settings, including, for example, color setting, DPI setting, and image size setting.

In the next step S102, the user interface 50 commands the scanner 10 to perform a primitive scan operation on the original document based on the default image processing settings in the user interface 50 to thereby obtain a primitive scanned image. The primitive scanned image is then transferred to the scanner driver 30.

In the next step S104, the scanner driver 30 is activated to perform an image-enhancement process on the primitive scanned image. The image-enhancement process includes automatic cutting, distortion correction, color calibration, and automatic character recognition.

Based the results from the foregoing image processing routines, the scanner driver 30 can recognize the image qualities of the original document and thereby automatically specify a set of suited image processing settings for optimal scan of the original document. These suited image processing settings also include color rendition, DPI, and image size, which will then override the default settings in the user interface 50, and also include the optimal settings for automatic cutting, distortion correction, color calibration, and automatic character recognition.

For example, if the default image processing settings are such that the color setting is COLOR and the DPI setting is 600 dpi; while the original document is a low-resolution B/W (black and white) document. In this case, the original document can be scanned with B/W setting and a low resolution setting. Through the image processing routines on the

primitive scanned image, the image qualities of the original document can be recognized, allowing the scanner driver 30 to change the image processing settings from the default settings (COLOR, 600 dip) to the suited settings (B/W, 300 dpi). Fundamentally, the scanner driver 30 will specify the suited image processing settings as close to the image

5   qualities of the original document as possible.

In the next step S106, the user interface 50 activates the scanner 10 to perform a final scan operation on the original document based on the suited image processing settings to thereby obtain a final scanned image.

In the next step S108, the final scanned image is transferred via the scanner driver

10   30 to the application program 40 so that the final scanned image can be used by the application program 40. The application program 40 can be either an image editing program or a word processor that can process the final scanned image as an image file.

In the next step S110, the user interface 50 displays a message asking whether the user wants to scan another document. If the user responds with YES, the procedure re-

15   turns to the step S100; otherwise, the procedure is ended.

In conclusion, the invention provides a method and user interface for performing an automatic scan operation for a scanner coupled to a computer system, which allows the user to scan an original document without requiring the user to specify image processing settings to the scan operation. The suited image processing settings can be automatically

20   obtained based on the image qualities of the primitive scanned image. This feature allows users of any skill levels to perform the scan operation without having to specify any image processing settings to the scan operation, making the use of the scanner easier and more user-friendly than the prior art.

The invention has been described using exemplary preferred embodiments. How-ever, it is to be understood that the scope of the invention is not limited to the disclosed embodiments. On the contrary, it is intended to cover various modifications and similar arrangements. The scope of the claims, therefore, should be accorded the broadest inter-pretation so as to encompass all such modifications and similar arrangements.

CLAIMS

What is claimed is:

1.   A method implemented on a user interface incorporated in a computer system coupled with a scanner for performing an automatic scan operation on an original docu-
5   ment, the computer system running a scanner driver and an application program; the method comprising the steps of:

storing a set of default image processing settings in the user interface;

activating the scanner to perform a primitive scan operation on the original docu-
ment based on the default image processing settings to thereby obtain a primitive scanned
10   image which is then transferred to the scanner driver;

activating the scanner driver to perform a set of image processing routines on the
primitive scanned image to thereby obtain the image qualities of the original document;
and based on the image qualities of the original document, specifying a set of suited image
processing settings for optimal scan of the original document; and

15   activating the scanner to perform a final scan operation on the original document
based on the suited image processing settings to thereby obtain a final scanned image
which is transferred to the application program for use by the application program.

2.   The method of claim 1, wherein the set of image processing routines include
automatic cutting.

20   3.   The method of claim 1, wherein the set of image processing routines include dis-
tortion correction.

4.   The method of claim 1, wherein the set of image processing routines include color
calibration.

5.   The method of claim 1, wherein the set of image processing routines include automatic character recognition.

6.   The method of claim 1, wherein the suited image processing settings are obtained in such a manner as to allow the image qualities of the final scanned image to be closest to

5   the image qualities of the original document.

7.   The method of claim 1, wherein the application program is an image editing program.

8.   The method of claim 1, wherein the application program is a word processor program.

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9.   A user interface for use on a computer system coupled with a scanner for performing an automatic scan operation on an original document, the computer system running a scanner driver and an application program;

the user interface comprising:

15   means for storing a set of default image processing settings;

means for activating the scanner to perform a primitive scan operation on the original document based on the default image processing settings to thereby obtain a primitive scanned image which is then transferred to the scanner driver;

means for activating the scanner driver to perform a set of image processing

20   routines on the primitive scanned image to thereby obtain the image qualities of the original document; and based on the image qualities of the original document, obtaining a set of suited image processing settings for optimal scan of the original document; and

means for activating the scanner to perform a final scan operation on the original document based on the suited image processing settings to thereby obtain a final scanned image which is transferred to the application program for use by the application program.

10.   The user interface of claim 9, wherein the set of image processing routines include automatic cutting.

11.   The user interface of claim 9, wherein the set of image processing routines include distortion correction.

12.   The user interface of claim 9, wherein the set of image processing routines include color calibration.

13.   The user interface of claim 9, wherein the set of image processing routines include automatic character recognition.

14.   The user interface of claim 9, wherein the suited image processing settings are obtained in such a manner as to allow the image qualities of the final scanned image to be closest to the image qualities of the original document.

15.   The user interface of claim 9, wherein the application program is an image editing program.

16.   The user interface of claim 9, wherein the application program is a word processor program.

*   *   *   *   *

ABSTRACT OF THE DISCLOSURE

A method and user interface is provided for use on a computer system coupled with a scanner for performing an automatic scan operation on an original document, with the computer system running a scanner driver and an application program. By the method

5 and user interface, the scanner is first activated to perform a primitive scan operation on the original document based on the default image processing settings to thereby obtain a primitive scanned image. Next, the scanner driver is activated to perform a set of image processing routines on the primitive scanned image to thereby obtain the image qualities of the original document; and based on the image qualities of the original document, a set

10 of suited image processing settings are specified for optimal scan of the original document. The suited image processing settings are then used to replace the default image processing settings, and the scanner is again activated to perform a final scan operation on the original document based on the suited image processing settings to thereby obtain a final scanned image which is transferred to the application program for use by the appli-

15 cation program.

*　*　*　*　*

FIG. 1

```
                    ┌─────────────┐
                    │    START    │
                    └──────┬──────┘
        ┌──────────────────▼──────────────────┐
        │  ┌────────────────────────────────┐ │
        │  │     Activate user interface    │ │──── S100
        │  └────────────────┬───────────────┘ │
        │                   │                  │
        │  ┌────────────────▼───────────────┐ │
        │  │     Perform a primitive scan   │ │──── S102
        │  └────────────────┬───────────────┘ │
        │                   │                  │
        │  ┌────────────────▼───────────────┐ │
        │  │ Process primitive scanned image│ │──── S104
        │  │  and obtain the suited settings│ │
        │  └────────────────┬───────────────┘ │
        │                   │                  │
        │  ┌────────────────▼───────────────┐ │
        │  │   Perform a final scan based    │ │──── S106
        │  │      on the suited settings     │ │
        │  └────────────────┬───────────────┘ │
        │                   │                  │
        │  ┌────────────────▼───────────────┐ │
        │  │ Tranfer the final scanned image │ │──── S108
        │  │   to the application program    │ │
        │  └────────────────┬───────────────┘ │
        │                   │                  │
        │ YES            ◇──▼──◇               │
        └──────────────◇  Scan another ◇──────── S110
                        ◇  document?  ◇
                         ◇──────┬──◇
                                │ NO
                         ┌──────▼──────┐
                         │     END     │
                         └─────────────┘
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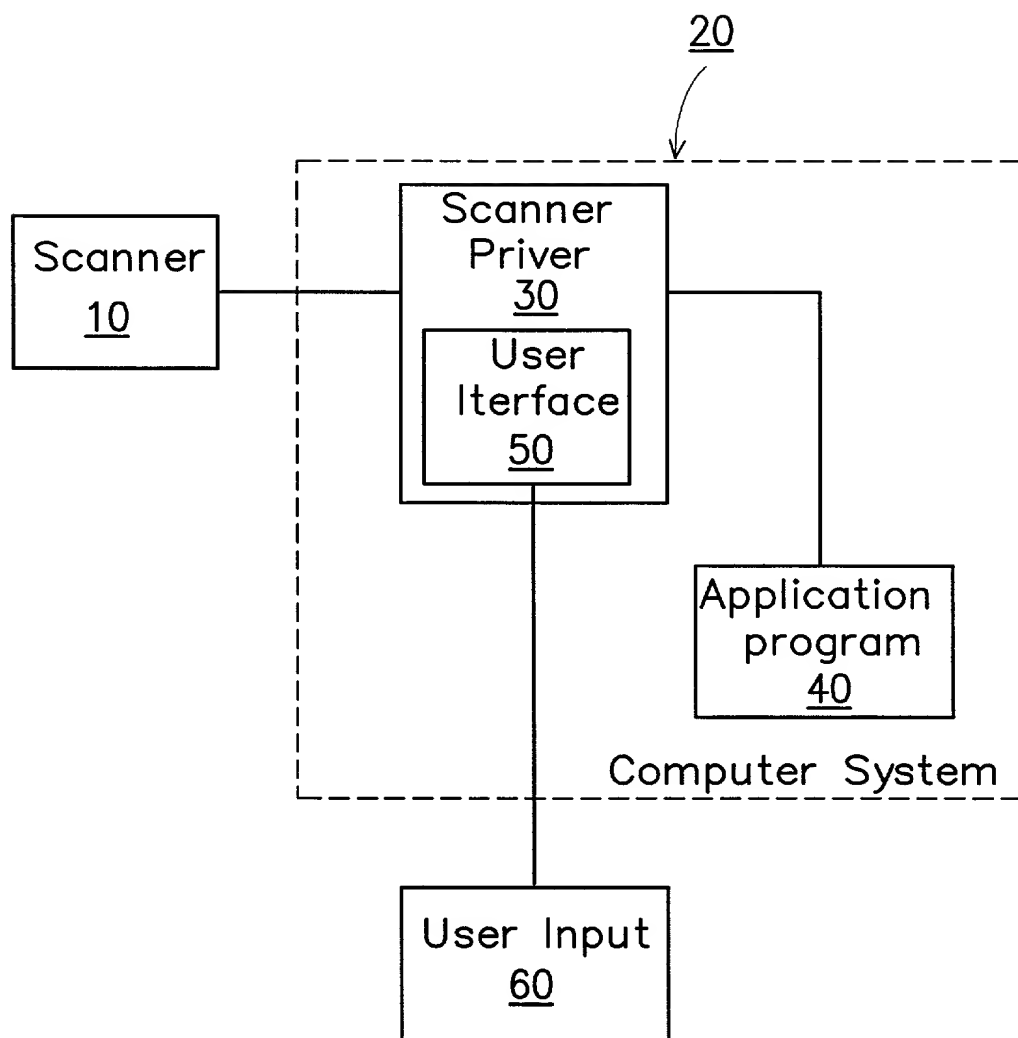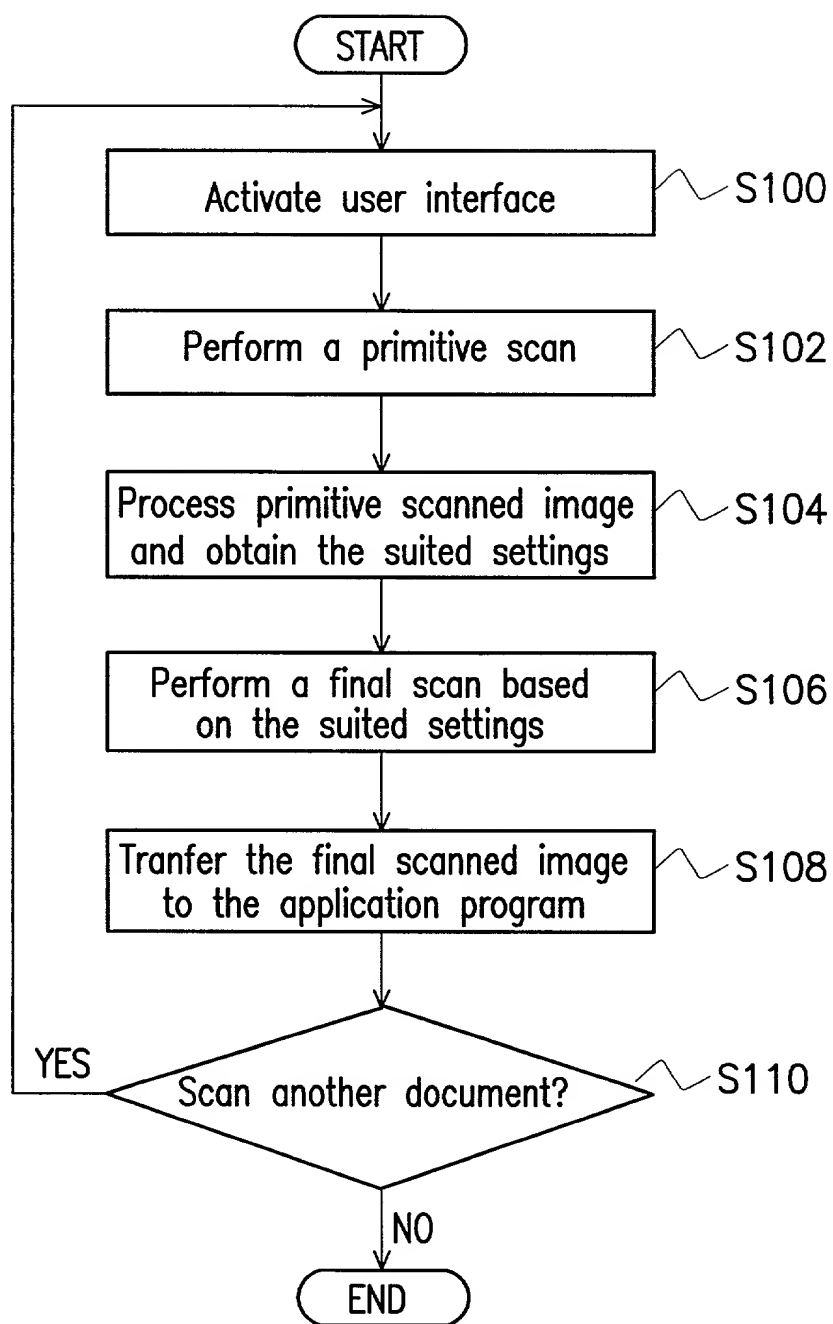
FIG. 2

COMBINED DECLARATION AND POWER OF ATTORNEY

As the below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name and that I believe I am an original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND USER INTERFACE FOR PERFORMING AN AUTOMATIC SCAN OPERATION FOR A SCANNER COUPLED TO A COMPUTER SYSTEM

the specification of which

__X__ is attached hereto.

___ was filed on _____

as Application Serial No._____ and was amended on_____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, Untied States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

Number	Country	Date Filed(yyyy/mm/dd)	Yes	No
88114079	Taiwan, R.O.C.	1999/8/18		X

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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